

A NEW *TACHYSPIHEX* FROM FLORIDA, WITH KEYS TO THE MALES
AND FEMALES OF THE FLORIDA SPECIES
(HYMENOPTERA: SPHECIDAE: LARRINAE)

FRANK E. KURCZEWSKI, *Department of Forest Entomology, State University College
of Forestry at Syracuse University, Syracuse, New York 13210*

ABSTRACT—*Tachysphex krombeini*, n. sp. is described from Florida. Keys to the males and females of the Florida species are presented. Notes on the ecology and nesting behavior of this new species are given.

This new species of *Tachysphex* from Florida is being described so that a name will be available for subsequent studies on the comparative behavior of the Nearctic species. The species was first collected by Karl V. Krombein during his and Howard E. Evans' 1953 and 1954 collecting trips through Florida. I have examined 18 of these specimens in addition to seven of my own. I am pleased to name the species for Karl V. Krombein, Smithsonian Institution, who first collected it and has contributed much to our knowledge of the behavior and taxonomy of the Hymenoptera.

***Tachysphex krombeini*, n. sp.**

Tachysphex sp. No. 3, Krombein and Evans, 1954. Proc. Ent. Soc. Wash. 56:233 (1 ♀, Arcadia, Fla.; 1 ♀, Orlando, Fla.).—Krombein and Evans, 1955. Proc. Ent. Soc. Wash. 57:231 (2 ♂ ♂, Marco, Fla.; 3 ♀ ♀, 1 ♂, Olga, Fla.; 4 ♀ ♀, 5 ♂ ♂, Arcadia, Fla.; 3 ♀ ♀, 5 ♂ ♂, Orlando, Fla.).

Holotype. ♂; Arcadia, DeSoto County, FLORIDA; March 31, 1954 (K. V. Krombein) [U. S. National Museum, Type No. 70720].

Male. Length 4.0–5.0 (mean, 4.4) mm, forewing 3.0–3.5 (mean, 3.2) mm. Black; apex of underside of scape, labrum, apical one-third to one-half of mandible, apices of tarsi, apex of innerside of hind tibia, last third to half of tegula testaceous; foretarsal pecten and other tarsal and tibial brushes and spines, except mid and hind spurs, golden-brown; apices of first six abdominal terga and sterna faintly coppery-colored; wings with membrane moderately infuscated, veins testaceous; no. of hamuli on margin of hindwing, 8–10 (mean, 9).

Vestiture conspicuous but not dense, silvery and rather appressed on underside of scape, base of mandible, face below median ocellus, back of head, thorax, legs, and sterna and apices of first five abdominal terga; short, erect, prominent setae on antennae.

Clypeus and frons finely and densely punctured, except apical bevel of clypeus polished and with scattered punctures, clypeal lip smooth and broadly rounded, separated from bevel by an impressed line; punctures on vertex more widely separated than those on frons; vertex rather shiny around and behind posterior ocelli; scutum and scutellum not as shiny, with closer punctures, propodeum moderately granulose above, laterally with fine, close oblique rugae, declivity with coarse oblique rugae; first six abdominal terga rather shiny, with relatively sparse, shallow punctures; seventh tergum with larger, more distinct punctures.

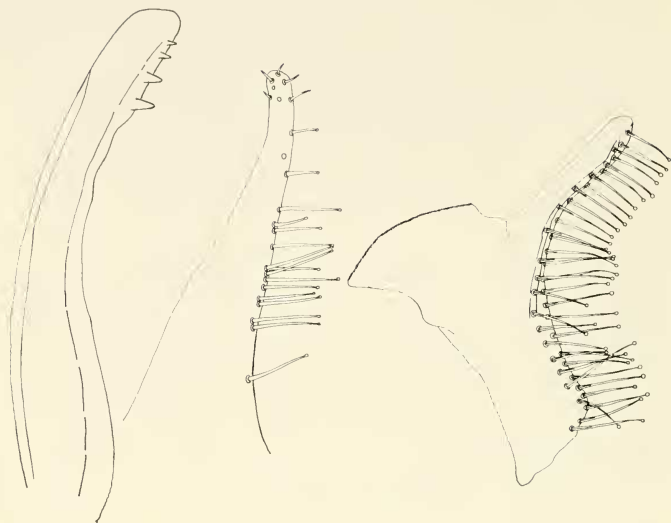


Fig. 1. Aedeagus, gonostyle, and volsella, respectively, of *Tachysphex krombeini*, n. sp. Illustrations are from paratypes, based on ocular grid drawings from dissected and whole mounts. Details were obtained at a magnification of 450 \times .

Range of ratios (with mean in parentheses) of lengths of first three flagellar segments, head width, least interocular distance (see R. Bohart, 1962), and clypeal breadth as 6-8 (7.1) : 8-10 (8.9) : 8-10 (9.0) : 63-82 (71.2) : 16-18 (17.4) : 38-47 (42.1).

Front tarsus with a definite comb, apical two setae of basal tarsomere about two-fifths its length; number of lateral setae per tarsomere from basal segment: 4-5, 2, 1-2, 1, 0.

Genitalia (fig. 1): Setae of volsella moderately long, stout, capitate, and seemingly bipartite at base, relatively few in number, well-spaced, and arranged in two nearly parallel rows; setae of gonostyle moderately long or shorter toward apex, stout, frequently knobbed, less tapered than those of volsella, fewer in number, and staggered in an indistinct row or two except at apex; serrated crest of volsella with margin evenly arched above, more abrupt posteriorly; aedeagus relatively long with four or five well-spaced teeth, which decrease in size toward apex; apical (fifth) tooth barely distinguishable, basal tooth may be sharply notched.

Allotype. ♀; same data as holotype [USNM].

Female. Length 5.0-6.5 (mean, 5.9) mm, forewing 3.5-4.5 (mean, 4.0) mm. Colored as in male, except apical two-fifths to one-half of mandible, sting and sheath testaceous; apices of first five abdominal terga and sterna faintly coppery

colored; wings with membrane apparently slightly more infuscated than in male, veins testaceous; no. of hamuli on margin of hindwing, 9-13 (mean, 11).

Vestiture similar to that of male except sparser and more appressed on abdomen, silvery bands across apices of first four abdominal terga; antennal setae not as stiff and erect.

Punctuation of clypeus, frons, vertex, scutum, scutellum, propodeum, and abdominal terga similar to that of male, except clypeal bevel highly polished and more sparsely punctured, lip highly polished, more broadly arched than in male, with a shallow lateral notch; separated from bevel by an impressed line.

Range of ratios (with mean in parentheses) of lengths of first three flagellar segments, head width, least interocular distance, and clypeal breadth as 10-13 (11.0) : 12-15 (13.3) : 13-16 (14.4) : 85-105 (92.4) : 18-21 (18.9) : 50-59 (53.4).

Front tarsus with individual setae about three-fourths as long as basal tarsomere; number of setae per tarsomere from basal segment: 5-6, 3-4, 3, 2, 0.

Pygidium polished apically, otherwise subpolished, with a fine reticulation, sparsely punctured, angled at about 35 degrees, not depressed.

Paratypes. 10♂♂, 13♀♀; Arcadia, DeSoto County, FLA., April 2-3, 1953 (♀), March 31, 1954 (3♂♂, 3♀♀) (K. V. Krombein); same locality, April 6, 1966 (1♂), March 30, 1967 (1♂), March 29, 1968 (1♂), June 27, 1967 (1♀) (Ethology Note No. TX-72), April 6-9, 1971 (3♀♀) (F. E. Kurczewski); Olga, Lee County, FLA., March 29, 1954 (1♀), March 30, 1954 (2♀♀) (K. V. Krombein); Orlando, Orange County, FLA., April 4, 1953 (1♀), April 3, 1954 (1♀, 4♂♂) (K. V. Krombein). All specimens collected "on sand" or "on sand flats." Paratypes have been deposited in the collections of the U. S. National Museum, K. V. Krombein, F. E. Kurczewski, University of California at Davis, Museum of Comparative Zoology, and Cornell University.

Tachysphex krombeini can be readily distinguished from the other Florida species by the combination of small size, all-black color, narrow least interocular distance, foretarsal comb and distinctive genitalia in the male, and clypeus with only a single notch laterally in the female. In Florida it is allied to the recently described *T. boharti* Krombein, which has the abdomen partly or entirely red, is slightly larger, has a wider least interocular distance, a much more polished pygidium, and, according to Krombein (1963), distinctive genitalia.

The following keys will serve to separate the males and females of the Florida species of *Tachysphex*. In many cases I have utilized size and color for the sake of convenience although it is recognized that such characters show considerable infraspecific variation.

MALES

1. Vertex with long, erect setae; a distinct convexity behind each posterior ocellus; vertex and thorax highly polished, with well-separated punctures. 2
- Vertex with very short setae or none at all; no convexities behind posterior ocelli; vertex and thorax subpolished, opaque, or subopaque with fine, close punctures 3

2. Foretarsus with a distinct digging comb **similis** Rohwer
 Foretarsus without a digging comb **apicalis** Fox
3. Large species, body length about 11–12 mm; all-black **punctifrons** (Fox)
 Small species, less than 10 mm long; black or red and black 4
4. Foretarsus without a digging comb; apices of femora, tibiae, and tarsi
 testaceous or yellowish; setae on face golden **minimus** (Fox)
 Foretarsus with a distinct digging comb; tarsi at most reddish; setae on
 face silvery or cinereous 5
5. All-black **krombeini**, n. sp.
 Abdomen red and black 6
6. Scutum and scutellum opaque; propodeal declivity granulose; larger
 species, body length 6–7 mm **laevifrons** (Smith)
 Scutum and scutellum shiny; propodeal declivity with oblique rugae;
 smaller species, body length 5 mm **boharti** Krombein

FEMALES

1. Vertex with long, erect setae; a distinct convexity behind each posterior
 ocellus; vertex and thorax highly polished, with well-separated punctures ... 2
 Vertex with very short setae or none at all; no convexities behind posterior
 ocelli; vertex and thorax subpolished, opaque, or subopaque with fine,
 close punctures 3
2. Anterior margin of clypeus with a median lobe; least interocular distance
 (vertex) more than one-half the interocular distance at the lower edge
 of the eyes; last abdominal tergite red **apicalis** Fox
 Anterior margin of clypeus not produced into a lobe; least interocular
 distance one-half or less the interocular distance at the lower edge of the
 eyes; abdomen entirely black **similis** Rohwer
3. Anterior edge of clypeus with a median emargination and two lateral teeth ... 4
 Anterior margin of clypeus entire or with only a single notch laterally 5
4. Abdomen black; vestiture silvery or occasionally golden in older speci-
 mens **minimus** (Fox)
 Abdomen red and black; vestiture golden sp. nr. **belfragei** (Cresson)
5. Abdomen black 6
 Abdomen red or red and black 7
6. Large species, body length about 12–13 mm **punctifrons** (Fox)
 Small species, body length 5–6 mm **krombeini**, n. sp.
7. Abdomen red and black; hind legs black; body covered with short, cinereous
 setae; larger species, 7.5–9.5 mm long **laevifrons** (Smith)
 Abdomen red; hind femora black or reddish; body covered with rather long,
 silvery setae; smaller species 5.5–7.5 mm long **boharti** Krombein

T. krombeini nests in areas of sand with sparse vegetation (see fig. 4, Krombein and Kurczewski, 1963). The inclusive dates of collection of the type series (March 29–June 27) suggest two or more generations per year in Florida. Such multivoltinism is common in this genus. Of the six other species of *Tachysphex* which inhabit the sand flats at Arcadia, Florida, only *T. laevifrons* is univoltine. The following notes

on the nesting behavior of *T. krombeini* were obtained on June 27, 1967 at Arcadia at an ambient temperature of 31° C.

One wasp (ethology note no. TX-72) constructed her nest in loose sand amidst grasses and decumbent twigs. Her entrance, 3 mm in diameter, was situated beside a grass clump and beneath an overhanging twig. The sand removed from the burrow formed a tumulus, 2.0 cm long, 1.9 cm wide, and 0.9 cm high, in front of the entrance. The nest entrance was left open during the provisioning trips. Beginning at 1330 hours the female was observed to bring five prey to her nest in 65 minutes. She spent 1-31 minutes for individual provisioning trips. Prey were brought to the nest in rather high, rapid flights, the speed of the flights varying inversely with the sizes of the prey. The provisioning wasp held the prey underneath her body with the legs, grasping its antennae with the mandibles. She plunged into the entrance, quickly releasing the prey just inside, and disappeared from sight. She reappeared head first 3-8 seconds later, and, grasping the prey by its antennae with the mandibles, backed into the nest. The fact that each individual was released ventral side up suggests that they were transported to the nest in this position. Small individuals were released farther inside the entrance than larger ones. For example, two small prey were released with only their hind tarsi and last few abdominal sternites visible in the entrance. Larger prey, on the other hand, were placed with the head inside the entrance, the remainder of the body lying exposed on the sand. Eight to sixteen seconds after pulling in the prey the wasp reappeared head first in the entrance and flew away. In no case did she orient to her surroundings or turn toward the entrance. Twice I was able to follow her during her hunting excursions. In both cases she searched for prey near her nest. Hunting activities included flying from plant to plant, running on the stems and leaves, and hovering nearby. In such a manner she was seen to flush tiny prey from the vegetation but was unsuccessful in capturing any of these individuals. At about 1435 hours the provisioning female returned with her last prey, took it inside, and remained in the nest for several minutes. She finally appeared head first, filling the burrow. Coming outside, she raked sand backward with the forelegs which were bent medially; then she backed into the burrow while raking and packed the sand into the tunnel with the bent end of the abdomen. While hammering she held the antennal tips against the walls of the burrow. I collected the wasp before she finished and then excavated her nest.

The burrow, 3 mm in diameter, entered the sand at an angle of about 37° to the horizon, coursed obliquely for 4.8 cm, and terminated in a small oval cell, 2.8 cm beneath the surface. The cell contained seven rather thoroughly paralyzed prey—six nymphal acridids (*Melan-*

oplus sp.) and one nymphal tettigoniid (*Odontoxiphidium apterum* Morse). Five of the acridids, including the one to which the wasp's egg was attached, were positioned ventral side up and head inward. The other acridid and tettigoniid were each placed dorsal side up and head inward. The tettigoniid weighed only 4 mg, the acridids, 5, 5, 6, 6, 6, and 8 mg (female wasp, 6.5 mg), or a total of 40 mg for the cell contents. The wasp's egg was attached by the cephalic end to the soft corium surrounding the base of the largest acridid's left forecoxa and laid transversely behind the front legs. It was slightly curved throughout its length, sausage-shaped, cream in color, elastic, and 1.5 mm long and 0.4 mm wide. It was preserved in 70 percent alcohol for further study.

One female was captured at Arcadia at 1410 hours on April 9, 1971, flying with a paralyzed nymphal *Melanoplus* sp. The wasp weighed 6.5 mg, and the prey, 7 mg.

T. krombeini is the only Florida species which nests in flat sand, leaves the nest entrance open during provisioning trips, transports the prey in flight, makes a single-celled nest, and stores several tiny acridids and tettigoniids mixed in the cell. Its nesting behavior most closely resembles that of *T. sepulcralis* Williams, a species of the Great Plains, except that *T. sepulcralis* stores only acridids. In Florida both *T. boharti* and *T. laevifrons* nest in flat sand, leave the nest entrance open during provisioning trips, and construct a one-celled nest; however, these species store only one or a few larger acridids per cell and often transport the prey on the ground.

ACKNOWLEDGMENTS

I am grateful to Karl V. Krombein, Smithsonian Institution, for reading the manuscript critically, and to Ashley B. Gurney, U. S. National Museum, for identifying the prey acridids and tettigoniids. I am also indebted to Richard Archbold and his staff for providing the excellent facilities of the Archbold Biological Station, Lake Placid, Florida. Carey E. Vasey, one of my graduate students, kindly dissected and mounted the male genitalia for study.

REFERENCES

- Bohart, R. M.** 1962. New species of black *Tachysphex* from North America (Hymenoptera, Sphecidae). Proc. Biol. Soc. Wash. 75:33-40.
- Krombein, K. V.** 1963. A new *Tachysphex* from southeastern United States (Hymenoptera, Sphecidae). Ent. News 74:177-180.
- Krombein, K. V. and H. E. Evans.** 1954. A list of wasps collected in Florida, March 29 to April 5, 1953, with biological annotations (Hymenoptera, Aculeata). Proc. Ent. Soc. Wash. 56:225-236.
- . 1955. An annotated list of wasps collected in Florida, March 20 to April 3, 1954 (Hymenoptera, Aculeata). Proc. Ent. Soc. Wash. 57:223-235.
- and **F. E. Kurezewski.** 1963. Biological notes on three Floridian wasps (Hymenoptera, Sphecidae). Proc. Biol. Soc. Wash. 76:139-152.